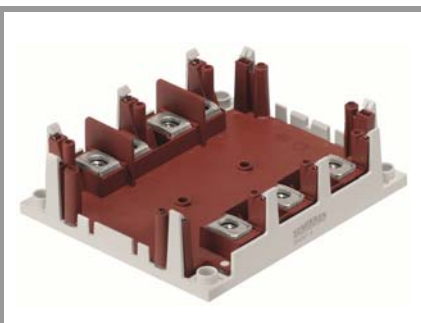




SKiM® 4

Trench IGBT Modules

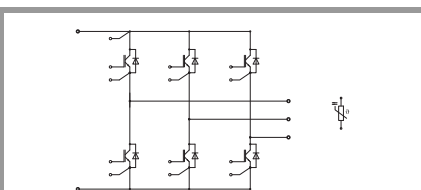
SKiM400GD126DM

Features

- Trench gate IGBT with field stop layer
- Low inductance case
- Fast & soft inverse CAL diodes
- Isolated by AlN DCB (Direct Copper Bonded) ceramic plate
- Pressure contact technology for thermal contacts
- Spring contact system to attach driver PCB to the control terminals
- Integrated temperature sensor

Typical Applications*

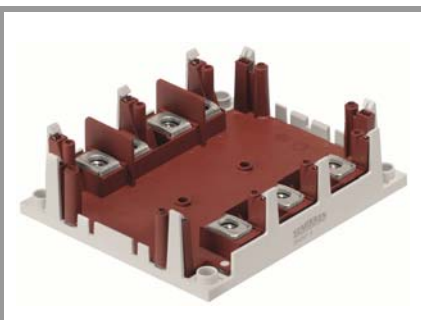
- Switched mode power supplies
- Three phase inverters for AC motor speed control
- Switching (not for linear use)



GD

Absolute Maximum Ratings				
Symbol	Conditions		Values	Unit
IGBT				
V _{CES}			1200	V
I _C	T _j = 150 °C	T _s = 25 °C	330	A
		T _s = 70 °C	256	A
I _{Cnom}			300	A
I _{CRM}	I _{CRM} = 2xI _{Cnom}		600	A
V _{GES}			-20 ... 20	V
t _{psc}	V _{CC} = 600 V V _{GE} ≤ 15 V V _{CES} ≤ 1200 V	T _j = 125 °C	10	μs
T _j			-40 ... 150	°C
Inverse diode				
I _F	T _j = 150 °C	T _s = 25 °C	300	A
		T _s = 70 °C	197	A
I _{Fnom}			200	A
I _{FRM}	I _{FRM} = 2xI _{Fnom}		400	A
I _{FSM}	t _p = 10 ms, sin 180°, T _j = 25 °C		2592	A
T _j			-40 ... 150	°C
Module				
I _{t(RMS)}	T _{terminal} = 80 °C		400	A
T _{stg}			-40 ... 125	°C
V _{isol}	AC sinus 50 Hz, t = 1 min		2500	V

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
IGBT						
V _{CE(sat)}	I _C = 300 A	T _j = 25 °C		1.70	2.10	V
	V _{GE} = 15 V chipelevel	T _j = 125 °C		2.00	2.45	V
V _{CE0}	chipelevel	T _j = 25 °C		1.00	1.20	V
		T _j = 125 °C		0.90	1.10	V
r _{CE}	V _{GE} = 15 V chipelevel	T _j = 25 °C		2.3	3.0	mΩ
		T _j = 125 °C		3.7	4.5	mΩ
V _{GE(th)}	V _{GE} =V _{CE} , I _C = 12 mA		5	5.8	6.5	V
C _{ies}	V _{CE} = 25 V V _{GE} = 0 V	f = 1 MHz		21.53		nF
C _{oes}		f = 1 MHz		1.13		nF
C _{res}		f = 1 MHz		0.98		nF
I _{CES}	V _{GE} = 0 V, V _{CE} = 1200 V, T _j = 25 °C				5	mA
Q _G	V _{GE} = - 8 V...+ 15 V			2400		nC
R _{Gint}	T _j = 25 °C			2.5		Ω
t _{d(on)}	V _{CC} = 600 V	T _j = 125 °C		285		ns
t _r	I _C = 300 A	T _j = 125 °C		45		ns
E _{on}	R _{G on} = 1 Ω	T _j = 125 °C		25		mJ
t _{d(off)}	R _{G off} = 1 Ω	T _j = 125 °C		580		ns
t _f	di/dt _{on} = 11000 A/ μs	T _j = 125 °C		95		ns
E _{off}	di/dt _{off} = 2700 A/μs	T _j = 125 °C		36.2		mJ
R _{th(j-s)}					0.134	K/W



SKiM® 4

SKiM400GD126DM

Features

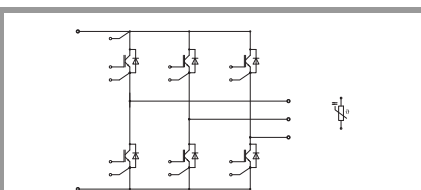
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Typical Applications*

- Switched mode power supplies
- Three phase inverters for AC motor speed control
- Switching (not for linear use)

Characteristics						
Symbol	Conditions		min.	typ.	max.	Unit
Inverse diode						
V _F = V _{EC}	I _F = 200 A	T _j = 25 °C		1.92	2.40	V
	V _{GE} = 0 V chiplevel	T _j = 125 °C		1.71	2.20	V
V _{F0}	chiplevel	T _j = 25 °C		1.1	1.45	V
		T _j = 125 °C		0.85	1.20	V
r _F	chiplevel	T _j = 25 °C		4.1	4.8	mΩ
		T _j = 125 °C		4.3	5.0	mΩ
I _{RRM}	I _F = 300 A	T _j = 125 °C		450		A
Q _{rr}	di/dt _{off} = 11000 A/ μs	T _j = 125 °C		46.5		μC
E _{rr}	V _{GE} = -15 V V _{CC} = 600 V	T _j = 125 °C		22		mJ
R _{th(j-s)}	per diode				0.19	K/W
Module						
L _{CE}				10		nH
R _{CC'+EE'}	measured per switch	T _s = 25 °C		1.35		mΩ
		T _s = 125 °C		1.75		mΩ
M _s	to heat sink (M5)		2		3	Nm
M _t		to terminals M6	4		5	Nm
w					317	g

Characteristics					
Symbol	Conditions	min.	typ.	max.	Unit
Temperature Sensor					
R ₁₀₀	T _r =100°C (R ₂₅ =1000Ω)		1670 ± 3%		Ω
R(T)	R(T)=1000Ω[1+A(T-25°C)+B(T-25°C) ²], A = 7.635*10 ⁻³ °C ⁻¹ , B = 1.731*10 ⁻⁵ °C ⁻²				



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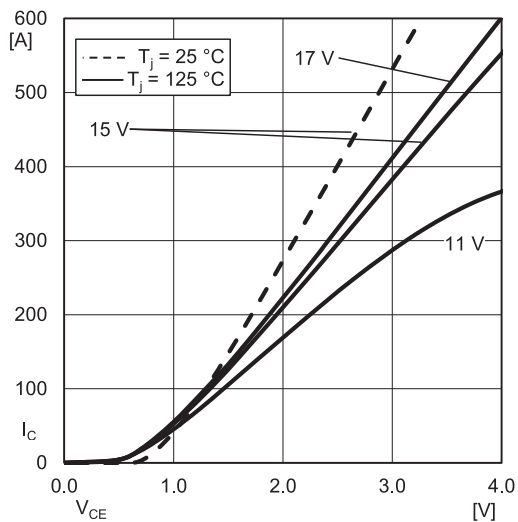


Fig. 1: Typ. output characteristic, inclusive $R_{CC'} + E_{E'}$

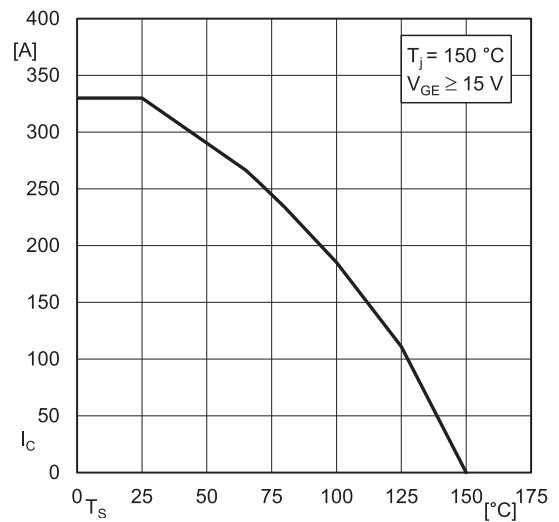


Fig. 2: Rated current vs. temperature $I_C = f(T_C)$

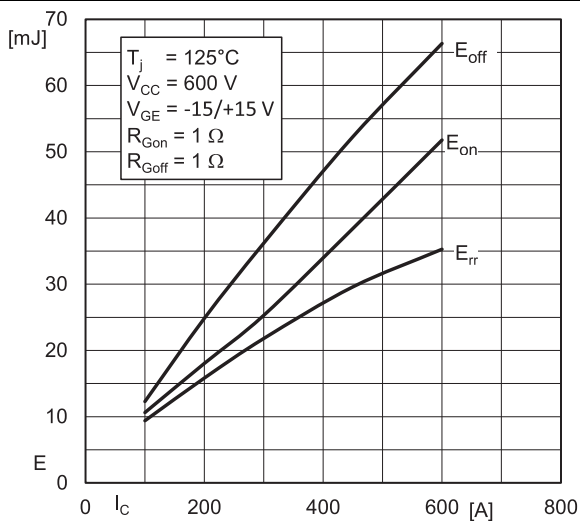


Fig. 3: Typ. turn-on /-off energy = $f(I_C)$

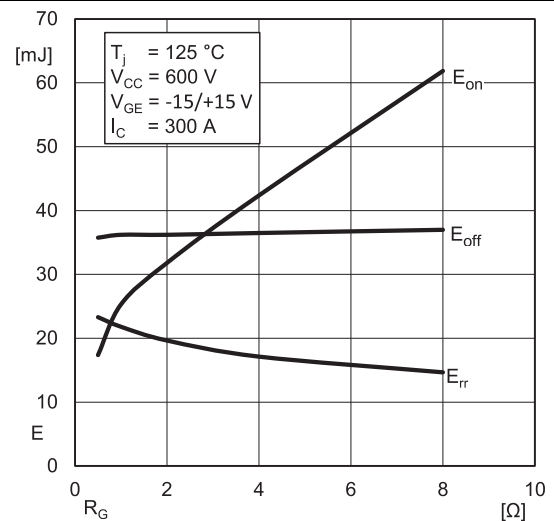


Fig. 4: Typ. turn-on /-off energy = $f(R_G)$

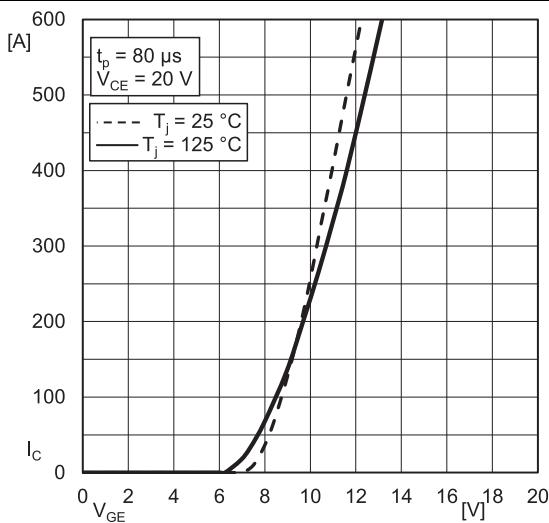


Fig. 5: Typ. transfer characteristic

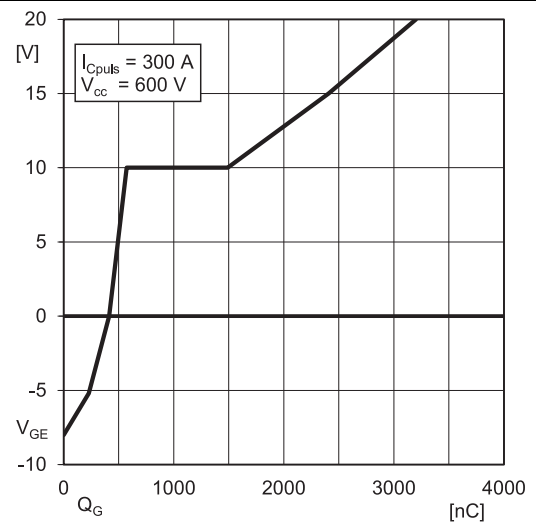


Fig. 6: Typ. gate charge characteristic

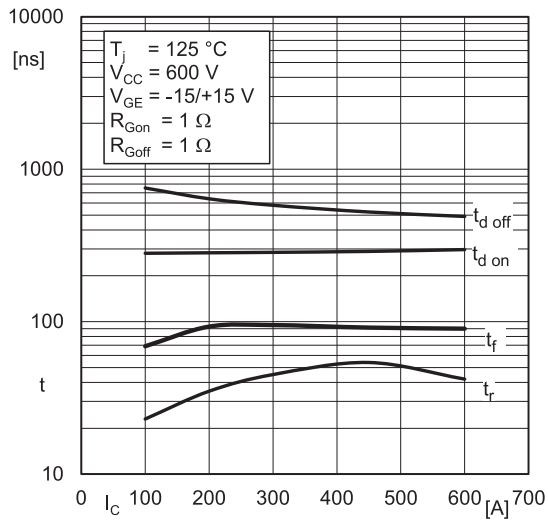


Fig. 7: Typ. switching times vs. I_C

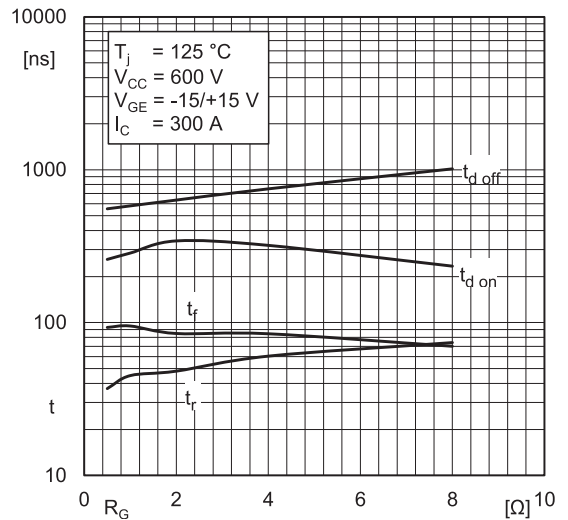


Fig. 8: Typ. switching times vs. gate resistor R_G

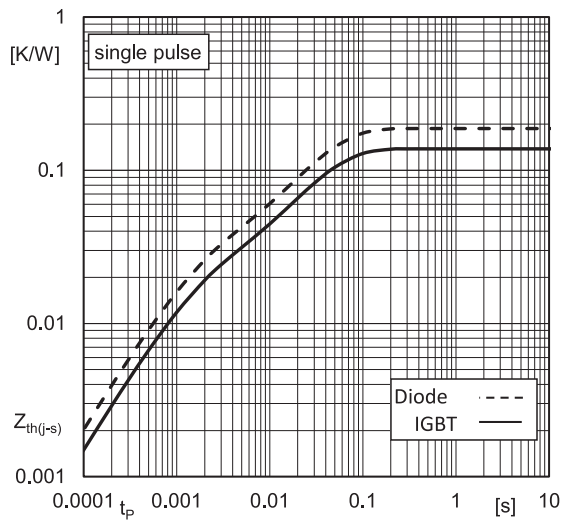


Fig. 9: Typ. transient thermal impedance

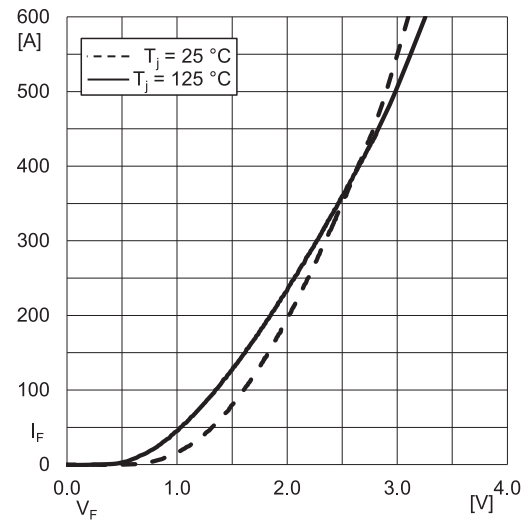
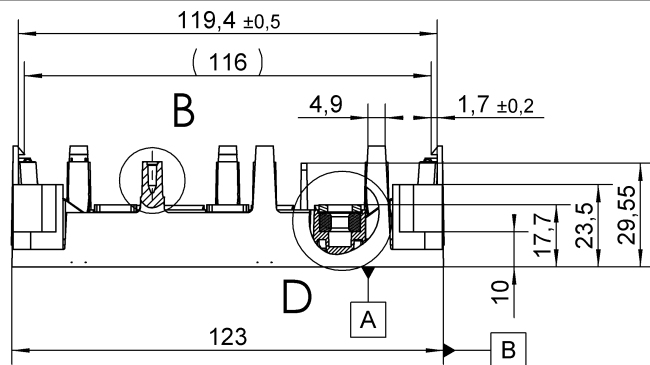
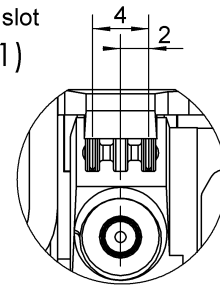


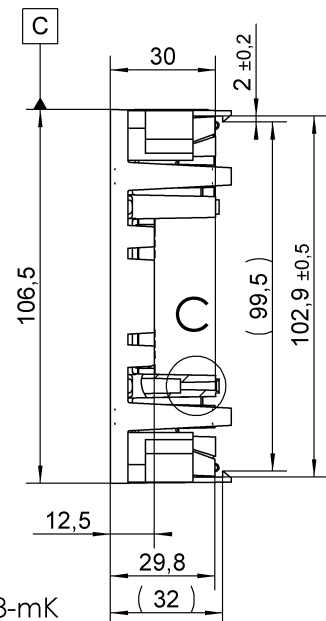
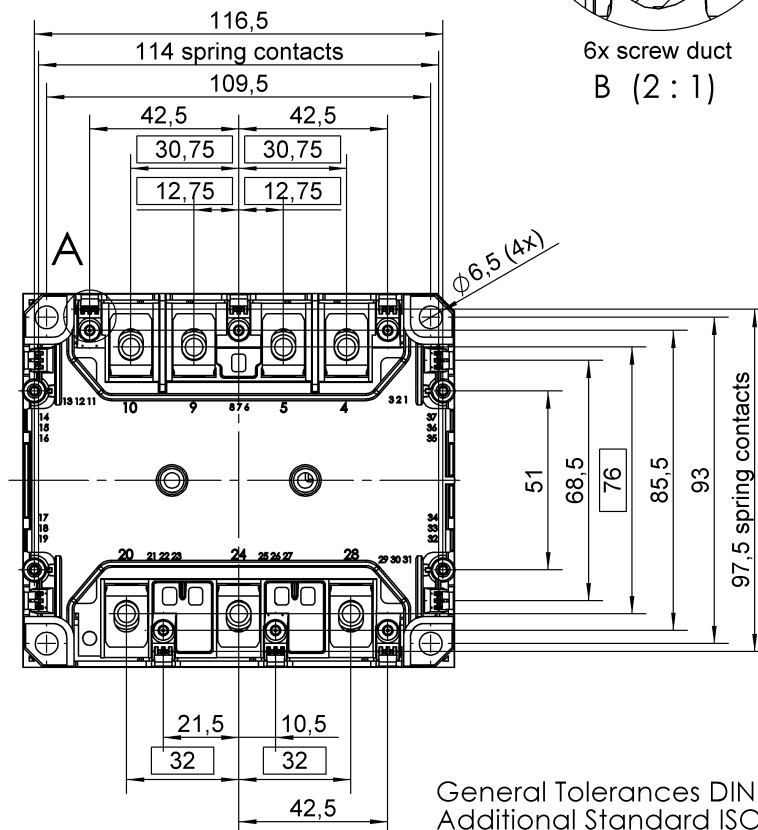
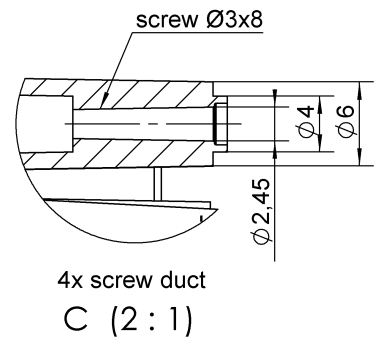
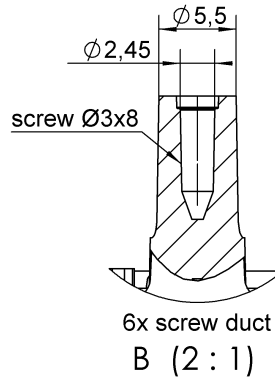
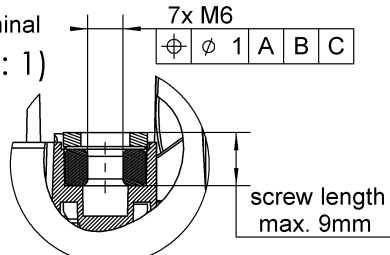
Fig. 10: Typ. CAL diode forward charact., incl. $R_{CC'+EE'}$



10x spring slot
A (2 : 1)

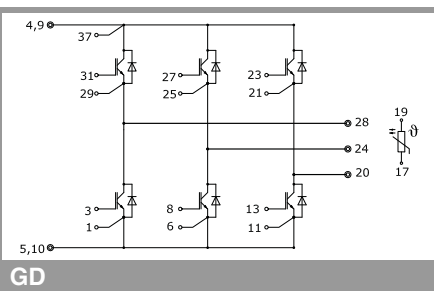


7x terminal
D (1 : 1)



General Tolerances DIN ISO 2768-mK
Additional Standard ISO 8015

SKiM 4



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This is an electrostatic discharge sensitive device (ESDS), international standard IEC 60747-1, chapter IX.

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